3.44 It is currently known that HDSL technology is spectrally incompatible with a number of embedded services and technologies. These services and technologies include 15 kHz Program Audio Service, Type II and Type III PSDS, DVM technology associated with CO-LAN service, and Analog Carrier technology.

3.45 15 kHz Program Audio and 2WDH or 4WDH loops are spectrally compatible when they use pairs that are located in different binder groups. Pairs in non-adjacent binder groups are preferred, but pairs in adjacent binder groups will usually provide the necessary separation.

3.46 Type II PSDS, which is also known as AT&T CSDC, is no longer available from BA. Type III PSDS services (Nortel Datapath technology) is spectrally compatible with 2WDH or 4WDH loops when the technologies use pairs that are located in different binder groups.

3.47 BA LANGATE service is a CO-LAN service that uses DVM technology. If DVMs are operated at less than 80% of the maximum specified range, they are spectrally compatible with 2WDH and 4WDH loops. If operated at or above the 80% range however, DVMs are spectrally compatible with 2WDH and 4WDH loops when they use pairs that are located in different binder groups.

3.48 Analog Carrier systems are being phased out in BA.. Analog Carrier systems and 2WDH or 4WDH loops may need to be assigned to pairs in different cables in order to prevent the 2WDH or 4WDH loops from interfering with the Analog Carrier technology.

iv. Unbundled 2WDA Loops

3.49 Unbundled 2WDA loops use a subscriber loop facility between the CO and the EU-RDP.

3.50 An unbundled 2WDA-R loop shall meet the following selected Revised Resistance Design criteria:

(a) The loop shall be non-loaded.
(b) The total length of the loop shall be ≤ 18 kft.
(c) The total length of the loop plus the total bridged tap length shall be ≤ 18 kft.
(d) The direct current resistance of the loop measured between the CODF and the EU-RDP shall be 1300 ohms or less.
(e) The total length of all bridged tap shall be ≤ 6 kft.
(f) Loaded bridged tap is not permitted.

3.51 An unbundled 2WDA-C loop shall meet the following selected Revised Resistance Design criteria:

(a) The loop shall be non-loaded.
(b) The total length of the loop shall be ≤ 12 kft.
(c) The total length of the loop plus the total bridged tap length shall be ≤ 12 kft.
(d) The direct current resistance of the loop measured between the CODF and the EU-RDP shall be 1000 ohms or less.
(e) The total length of all bridged tap shall be ≤ 6 kft.
(f) Loaded bridged tap is not permitted.

3.52 The insulation resistance between the tip conductor and ground and the ring conductor and ground on unbundled 2WDA-R and 2WDA-C loops shall each be greater than 300 K ohms.

3.53 The 1kHz loss acceptance limit of an 2WDA-R metallic loop facility when measured with a 900 ohm impedance at the CODF and a 600 ohm impedance at the RDP shall be 8.5 dB or less.

3.54 The 1kHz loss acceptance limit of an 2WDA-C metallic loop facility when measured with a 900 ohm impedance at the CODF and a 600 ohm impedance at the RDP shall be 6.0 dB or less.

3.55 The C-message noise measured on an 2WDA metallic loop at the RDP shall be less than 30 dBrnC.

3.56 The longitudinal noise or power influence (PI) measured per IEEE Std 743-1995 [12] on an 2WDA metallic loop should be less than 90 dBrnC.

3.57 The longitudinal balance of a metallic 2WDA loop is defined as the longitudinal noise (in dBrnC) minus the C-message noise (in dBrnC). The longitudinal balance shall be >50 dB.

3.58 An unbundled 2WDA loop will not operate properly on non-staggered twist cable (installed prior to 1923) or on flat ribbon cables, such as those used for some CPE interconnections. Such cable may need to be replaced to accommodate 2WDA loops.

3.59 It is currently known that ADSL technology is spectrally incompatible with a number of embedded services and technologies. These services and technologies include 15 kHz Program Audio services, Type II and Type III PSDS, DVM technology associated with CO-LAN service, Analog Carrier technology, and some ADSL applications.

3.60 15 kHz Program Audio and 2WDA loops are spectrally compatible when they use pairs that are located in different binder groups. Pairs in non-adjacent binder groups are preferred, but pairs in adjacent binder groups will usually provide the necessary separation.

3.61 Type II PSDS, which is also known as AT&T CSDC, is no longer available from BA. Type III PSDS services (Nortel Datapath technology) is spectrally compatible with 2WDA loops when the technologies use pairs that are located in different binder groups.

3.62 BA LANGATE service is a CO-LAN service that uses DVM technology. If DVMs are operated at less than 80% of the maximum specified range, they are spectrally compatible with 2WDA loops. If operated at or above the 80% range however, DVMs are spectrally compatible with 2WDA loops when they use pairs that are located in different binder groups.

3.63 Analog Carrier systems are being phased out in BA. Analog Carrier systems and 2WDA loops may need to be assigned to pairs in different cables in order to prevent 2WDA loops from interfering with the Analog Carrier technology.

3.64 2WDA loops are not intended for applications that have spectral energy at power levels or in frequency bands that can interfere with other ADSL technology (including other 2WDA loops) in the same cable. Such interfering applications include:

- Reverse ADSL applications (i.e., End-user CPE transmits downstream frequencies and CO equipment transmits upstream frequencies);
- End-user to end-user ADSL applications (i.e., CPE at one end transmits downstream frequencies);
- Echo canceling ADSL technology or applications that permit the upstream frequency band to overlap the downstream frequency band defined in this document; and,
- Applications that use the power boost option described in ANSI T1.413-1995 (i.e., power level exceeds the PSD templates specified in this document).

v. Unbundled 4WDS3 Loop

3.65 An unbundled 4WDS3 loop uses a subscriber loop transport system between the serving CO and the EU NID. The loop transport system usually consists of, but is not limited to, either:

- an asynchronous fiber optic transport system; or,
- a Synchronous Optical NETwork (SONET) transport systems.

3.66 The loop transport system used for a 4WDS3 loop shall support the 4WDS3 performance criteria in Section 4.

F. Transmission Enhancement Equipment

3.67 Transmission enhancement equipment is sometimes used with 2WDI, 2WDH, and 4WDH loops. Such equipment can consist of a CO span power module and a Basic Rate ISDN mid-span repeater, a Basic Rate ISDN extended range system, or an HDSL doubler.

3.68 The span power module is located in the CO and provides power to a Basic Rate ISDN mid-span repeater. A Basic Rate ISDN mid-span repeater regenerates the 2B1Q line code. The repeater has NT functionality that faces the CLEC equipment and LT functionality that faces the RDP. A mid-span repeater can be deployed when the calculated loss of the non-repeatered loop at 40 kHz (excluding BT) is > 40.0 < 76.0 dB.

3.69 Basic Rate ISDN extended range systems consist of a unit located in the CO that has NT functionality and a 2B1Q line code that faces the CLEC equipment and a remote unit near the RDP that has LT functionality and delivers a 2B1Q line code to the EU customer. The CO unit uses a line code that is spectrum compatible with BA services. The line code permits operation with a remote unit that is connected via a metallic cable that could have a 40 kHz loss of up to 60 dB.

3.70 The impedance of transmission enhancement equipment used with an unbundled 2WDI loop shall be a nominal 135 ohms.

3.71 Transmission enhancement equipment for an unbundled 2WDI loop shall provide sealing current when the RDP is terminated by a direct-current resistance of 135 ohms.

3.72 An HDSL doubler is a special type of mid-span repeater that regenerates the HDSL line code. An HDSL doubler can be deployed when the calculated loss of the non-repeatered loop exceeds the manufacturer's specifications. HDSL doublers are limited to limited to approved technology.

4. Service Specifications

A. General

4.01 Parameters are tested at the NID in response to trouble reports or when additional testing is purchased.

4.02 Network Channel (NC) and Network Channel Interface (NCI) codes are used for providing channel and interface information to customers. The NC/NCI code set facilitates the identification of network channel requirements and associated interface specifications for services described in tariffs.

4.03 For unbundled digital loops, the NC code is an encoded representation of the channel that is provided by from the CLEC Point Of Termination (POT) to the EU-POT. By varying the NC code, the customer is allowed to further specify the type of channel.

4.04 The NCI code is an encoded representation used to identify five interface elements located at a POT. The five elements reflect the following physical and electrical characteristics: number of physical conductors, protocol, impedance, protocol options, and transmission levels points (if applicable).

4.05 Examples of the most common NC and NCI codes are given for each type of unbundled digital loop described in this section. The complete set of codes may be found in SR-STS-000307 [13].

4.06 Valid NCI code combinations are shown for each unbundled digital loop described in this section. Complete NC/NCI compatibility information may be found in SR-STS-000323 [14].

B. Unbundled 2WDI Loop

4.07 The overall end-to-end unbundled 2WDI loop service is from the CODF termination of the CLEC equipment to the EU customer's NID or RDP.

4.08 Unbundled 2WDI loops will use the DYVU service code.

4.09 2WDI NC code information is shown in Figure 4-1 and 2WDI NCI code combinations are shown in Figure 4-2.

4.10 2WDI Acceptance Limits (AL) and Immediate Action Limits (IAL) are shown in Table 4-3.

4.11 When digital loop carrier (DLC) is used to provide 2WDI, the DLC will provide an ISDN Basic Rate interface at the NID or RDP that meets the network requirements in ANSI T1.601-1992 [1].

Figure 4-1: 2WDI NC Codes

NC CODE	Character 3	Character 4
UB	-	-

Figure 4-2: 2WDI NCI Code Combinations

CLEC-POT	EU-POT
02QC5.OOS	02IS5

Figure 4-3: 2WDI Acceptance Limits (AL) and Immediate Action Limits (IAL)

Parameter	AL	IAL
40 kHz loss @ 135 ohms	≤ 40.0 dB	> 42.0 dB
Loop Resistance	≤ 1300 ohms	> 1300 ohms
Insulation Resistance	≥100 kilohms	< 100 kilohms
Power Influence	≤ 90 dBrnC	> 90 dBrnC

C. Unbundled 4WD1.5 Loop

4.12 The overall end-to-end unbundled 4WD1.5 loop service is from the DSX-1 termination of the CLEC equipment to the EU customer's NID.

4.13 Unbundled 4WD1.5 loops will use the DHDU service code.

4.14 Unbundled 4WD1.5 loops shall provide an electrical DSX-1 interface at the CLEC-POT that meets the DSX-1 specifications in ANSI T1.102-1993 [4]. The DS1 interface at the NID shall meets the network specifications in ANSI T1.403-1995 [3].

4.15 4WD1.5 NC code information is shown in Figure 4-4, and 4WD1.5 NCI code combinations are shown in Figure 4-5.

4.16 4WD1.5 performance objectives are shown in Figure 4-6 and 4WD1.5 test limits are shown in Figure 4-7.

4.17 Availability is a measure of the relative amount of time that a service is "usable" by the customer. Unavailability begins when the Bit Error Ratio (BER) in each second is worse than 1×10^{-3} for a period of 10 consecutive seconds. The 4WD1.5 objective is 99.925 percent availability in any twelve consecutive months. Availability equals the total time minus the outage time divided by the total time.

4.18 Accuracy denotes the error performance and is usually specified in terms of errored seconds (ES), or conversely, error-free seconds (EFS). EFS are the primary measure of error performance for 4WD1.5. An EFS is any second that an error does not occur.

4.19 A Severely Errored Second (SES) is any one second interval that has a BER of less than (worse than) 1×10^{-3}.

Figure 4-4: 4WD1.5 NC Codes

NC CODE	Character 3	Character 4
HC	- (SF and AMI)	-
HC	D (ESF and AMI)	-
HC	E (ESF and B8ZS)	-
HC	Z (SF and B8ZS)	-
HC	E (ESF and B8ZS)	I (ISDN PRA)

Figure 4-5: 4WD1.5 NCI Code Combinations

CLEC-POT	EU-POT
04QB9.11	04DU9.BN (SF and AMI)
04QB9.11	04DU9.DN (SF and B8ZS)
04QB9.11	04DU9.1KN (ESF and AMI)
04QB9.11	04DU9.1SN (ESF and B8ZS)

Figure 4-6: 4WD1.5 Performance Objectives

Parameter	Objective
Accuracy	0.25 % errored seconds long-term (30 days or more)
Availability	99.925 % per year

Figure 4-7: 4WD1.5 Test Limits

Test Duration	Errored Seconds	Severely Errored Seconds
15 min	0	0
30 min	≤ 3	0
45 min	≤ 5	≤ 2
24 hours	≤ 150	≤ 7

4.20 Acceptance testing for 4WD1.5 should be performed with a Quasi Random Signal Source (QRSS), on an CLEC-POT to EU-POT basis, using ES performance parameters.

4.21 If BA has installed a loopback device on the 4WD1.5, a dispatch for "cooperative testing" will not ordinarily be made and testing will be performed remotely. Normally, a technician will be dispatched by BA in the following instances:

(a) The 4WD1.5 is not equipped with a loopback device;
(b) The loopback device is inoperable;
(c) Test results do not meet applicable limits;
(d) The CLEC requests a dispatch.

4.22 At the request of the CLEC, BA will provide the remote test results to the CLEC.

4.23 Other tests may be performed in response to trouble reports or when additional testing is purchased. The 3/24, 1/8, and All Ones patterns are acceptable diagnostic stress tests for unbundled 4WD1.5 loops when used in accordance with Figure 4-8.

4.24 The patterns in Figure 4-8 may not detect all possible troubles. Additional tests may be required using other patterns designed to detect specific problems (e.g. bridged tap, etc).

4.25 If errors are detected using the QRSS, 3/24, or 1/8 patterns, it is recommended that the 4WD1.5 line code options (AMI/B8ZS) be verified using the procedures outlined in the Bell Atlantic Network Services Reference Manual Series 72710 & NS6050 [15]. These tests make use of the Framed 2/8 and Framed 1/8 patterns.

Figure 4-8: Pattern sensitivity test criteria (see notes 1 and 2)

TEST PATTERN (see note 3)	TEST DURATION	ACCEPTANCE LIMIT[1]
All Ones	5 minutes	0
3/24 (AMI only)	5 minutes	0
1/8	5 minutes	0
Framed All Zeros (4) (B8ZS only)	30 seconds	(see note 5)

Notes:

(1) Test patterns should be framed.

(2) One retest is allowed if the initial test fails.

(3) If compatible test equipment is not available to perform these tests, loopback testing should be utilized.

(4) WARNING: If used with the DS1 SF framing format, zeros will occur in time slot 2 of every octet (channel). Terminal equipment will display a false Remote Alarm Indication (a.k.a., yellow alarm). In addition, the use of the framed all-zeros pattern through some types of DS3 equipment may cause DS1 failure if the equipment is not properly optioned for B8ZS.

(5) As an equipment option check, failure will typically be seen as large error counts. Very low counts (e.g., 1 or 2 errors) are not indicative of an optioning problem.

[1] While some of the entries in this table are "0", it should be noted that an isolated error event is not necessarily indicative of a service affecting problem.

D. Unbundled 2WDH and 4WDH Loops

4.26 The overall end-to-end unbundled 2WDH and 4WDH loop services are from the CODF termination of the CLEC equipment to the EU customer's NID.

4.27 Unbundled 2WDH and 4WDH loops will use the AQDU service code.

4.28 2WDH and 4WDH NC code information is shown in Figure 4-12 and 2WDH and 4WDH NCI code combinations are shown in Figure 4-13.

4.29 2WDH and 4WDH Acceptance Limits (AL) and Immediate Action Limits (IAL) are shown in Table 4-14.

Figure 4-9: 2WDH and 4WDH NC Codes

NC CODE	Character 3	Character 4
LX	C (NL < 12kft)	-

Figure 4-10: 2WDH and 4WDH NCI Code Combinations

CLEC-POT	EU-POT
02QB5.OOH (2WDH)	02DU5.OOH
04QB5.OOH (4WDH)	04DU5.OOH

Figure 4-11: 2WDH and 4WDH Acceptance Limits (AL) and Immediate Action Limits (IAL)

Parameter	AL	IAL
Foreign Voltage *	≤ 1 volt	> 1 volt
Insulation Resistance	≥ 300 kilohms	< 120 kilohms
Loop Resistance	≤ 750 ohms	> 750 ohms
196 kHz Loss @ 135 ohms	≤ 53 dB	> 53 dB
Wideband Noise (50 kb filter)	≤ 28 dBrn	> 28 dBrn
Impulse Noise	≤ 7 counts in 15 minutes with 44 dBrn threshold	> 7 counts in 15 minutes with 44 dBrn threshold
Power Influence	≤ 90 dBrnC	> 90 dBrnC

* Foreign voltage must be measured with a high impedance voltmeter or erroneous readings may result. Tip-to-ring voltages must be ≤ 1 Vdc and ≤ 1 Vac. Tip-to-ground and ring-to-ground voltages must be ≤ 1 Vdc and ≤ 50 Vac

E. Unbundled 2WDA-R Loop

4.30 The overall end-to-end unbundled 2WDA-R loop service is from the CODF termination of the CLEC equipment to the EU customer's NID or RDP.

4.31 Unbundled 2WDA-R loops will use the ARSU and ARDU service codes.

4.32 2WDA-R NC code information is shown in Figure 4-15 and 2WDA-R NCI code combinations are shown in Figure 4-16.

4.33 2WDA-R Acceptance Limits (AL) and Immediate Action Limits (IAL) are shown in Table 4-17.

Figure 4-12: 2WDA-R NC Codes

NC CODE	Character 3	Character 4
LX	R (NL ≤ 18kft)	-

Figure 4-13: 2WDA-R NCI Code Combinations

CLEC-POT	EU-POT
02QB9.OOA (DMT)	02DU9.OOA (DMT)
02QB9.OOC (CAP)	02DU9.OOC (CAP)
02QB9.O1A (POTS + DMT)	02DU9.O1A (POTS + DMT)
02QB9.O1C (POTS + CAP)	02DU9.O1C (POTS + CAP)

Figure 4-14: 2WDA-R Acceptance Limits (AL) and Immediate Action Limits (IAL)

Parameter	AL	IAL
Foreign Voltage*	≤ 1 volt	> 1 volt
Insulation Resistance	≥ 300 kilohms	< 120 kilohms
Loop Resistance	≤ 1300 ohms	> 1300 ohms
1004 Hz loss **	≤ 8.5 dB	> 10.0 dB
196 kHz Loss @ 135 ohms	≤ 78 dB	> 78 dB
C-Message Noise **	≤ 30 dBrnC	> 30 dBrnC
Wideband Noise (50 kb filter)	≤ 28 dBrn	> 28 dBrn
Impulse Noise	≤ 7 counts in 15 minutes with 44 dBrn threshold	> 7 counts in 15 minutes with 44 dBrn threshold
Power Influence	≤ 90 dBrnC	> 90 dBrnC

* Foreign voltage must be measured with a high impedance voltmeter or erroneous readings may result. Tip-to-ring voltages must be ≤ 1 Vdc and ≤ 1 Vac. Tip-to-ground and ring-to-ground voltages must be ≤ 1 Vdc and ≤ 50 Vac.

** Voice band parameters do not apply to non-POTS applications.

F. Unbundled 2WDA-C Loop

4.34 The overall end-to-end unbundled 2WDA-C loop service is from the CODF termination of the CLEC equipment to the EU customer's NID or RDP.

4.35 Unbundled 2WDA-C loops will use the ARSU and ARDU service codes.

4.36 2WDA-C NC code information is shown in Figure 4-18 and 2WDA-C NCI code combinations are shown in Figure 4-19.

4.37 2WDA-C Acceptance Limits (AL) and Immediate Action Limits (IAL) are shown in Table 4-20.

Figure 4-15: 2WDA-C NC Codes

NC CODE	Character 3	Character 4
LX	C (NL ≤ 12kft)	-

Figure 4-16: 2WDA-C NCI Code Combinations

CLEC-POT	EU-POT
02QB9.OOA (DMT)	02DU9.OOA (DMT)
02QB9.OOC (CAP)	02DU9.OOC (CAP)
02QB9.O1A (POTS + DMT)	02DU9.O1A (POTS + DMT)
02QB9.O1C (POTS + CAP)	02DU9.O1C (POTS + CAP)

Figure 4-17: 2WDA-C Acceptance Limits (AL) and Immediate Action Limits (IAL)

Parameter	AL	IAL
Foreign Voltage*	≤ 1 volt	> 1 volt
Insulation Resistance	≥ 300 kilohms	< 120 kilohms
Loop Resistance	≤ 1000 ohms	> 1000 ohms
1004 Hz loss **	≤ 6.0 dB	> 6.5 dB
196 kHz Loss @ 135 ohms	≤ 53 dB	> 53 dB
C-Message Noise**	≤ 30 dBrnC	> 30 dBrnC
Wideband Noise (50 kb filter)	≤ 28 dBrn	> 28 dBrn
Impulse Noise	≤ 7 counts in 15 minutes with 44 dBrn threshold	> 7 counts in 15 minutes with 44 dBrn threshold
Power Influence	≤ 90 dBrnC	> 90 dBrnC

* Foreign voltage must be measured with a high impedance voltmeter or erroneous readings may result. Tip-to-ring voltages must be ≤ 1 Vdc and ≤ 1 Vac. Tip-to-ground and ring-to-ground voltages must be ≤ 1 Vdc and ≤ 50 Vac

** Voice band parameters do not apply to non-POTS applications.

G. Unbundled 4WDS3 Loop

4.38 The overall end-to-end unbundled 4WDS3 loop service is from the DSX-3 termination of the CLEC equipment to the EU customer's NID.

4.39 Unbundled 4WDS3 loops will use the HFFU and HIDU service codes.

4.40 Unbundled 4WS3 loops shall provide an electrical DSX-3 interface at the CLEC-POT that meets the DSX-3 specifications in ANSI T1.102-1993 [4]. The DS3 interface at the EU-POT shall meet the network specifications in ANSI T1.404-1994 [10].

4.41 The transmission rate of the DS3 signal shall be 44.736 Mbit/s +/- 895 b/s (+/- 20 ppm) in the self-timed free-running mode.

4.42 The DS3 line code shall meet the B3ZS line code specifications in ANSI T1.102-1993 [4].

4.43 The DS3 signal shall meet the M23 frame format specifications in ANSI T1.107-1995 [16].

4.44 4WDS3 NC code information is shown in Figure 4-21, and 4WDS3 NCI code combinations are shown in Figure 4-22.

4.45 4WDS3 performance objectives are shown in Figure 4-23 and 4WDS3 test limits are shown in Figure 4-24.

4.46 Availability is a measure of the relative amount of time that a service is "usable" by the customer. Unavailability begins when the Bit Error Ratio (BER) in each second is worse than 1×10^{-3} for a period of 10 consecutive seconds. Transition to the available state occurs again at the beginning of 10 consecutive seconds none of which is a severely errored second. Availability equals the total time minus the outage time divided by the total time.

4.47 The DS3 unavailability objective is 263 minutes per year. This equates to 99.95 percent availability in any twelve consecutive months.

4.48 Accuracy denotes the error performance and is usually specified in terms of errored seconds (ES), or conversely, error-free seconds (EFS). An EFS is any second that an error does not occur.

4.49 A Severely Errored Second (SES) is any one second interval that has a BER of less than (worse than) 1×10^{-3}.

4.50 DS3 acceptance testing should be performed with a QRSS or PRBS pattern using the ES performance parameters in Figure 4-2. The PRBS is a binary sequence that approximates a random signal and is recommended for DS3. The PRBS pattern for DS3 is 2^{23} -1 bits in length and generates every combination of 23-bit words.

4.51 If the DS3 has remote loopback capability, a dispatch for "cooperative testing" will not ordinarily be made and testing will be performed remotely. Normally, a technician will be dispatched by BA in the following instances:

(a) The DS3 is not equipped with loopback capability;
(b) The DS3 loopback capability is inoperable;
(c) Test results do not meet applicable limits;
(d) The CLEC requests a dispatch.

Figure 4-18: 4WDS3 NC Code

NC Code	Character 3	Character 4
HF	-	-

Figure 4-19: Valid 4WDS3 NC/NCI Code Combinations

CLEC-POT	EU-POT
04QB6.33	04DS6.44

Figure 4-20: 4WDS3 Performance Objectives

Parameter	Objective
Accuracy	0.5% errored seconds long-term (30 days or more) 0.01% severely errored seconds long-term (30 days or more)
Availability	99.950 % available per year

Figure 4-21: 4WDS3 Test Limits

Test Duration	Errored Seconds	Severely Errored Seconds
1 hour	≤ 5	0
2 hours	≤ 18	≤ 2
24 hours	≤ 300	≤ 7

5. CLEC Equipment and CO Cabling Requirements

A. CLEC Equipment Requirements

5.01 Collocated CLEC equipment used for interconnection with unbundled digital loops shall meet all of the applicable generic equipment requirements in Bellcore GR-63-CORE [17] and Bellcore GR-1089-CORE [6].

5.02 Collocated CLEC equipment used for interconnection with unbundled digital loops shall be manufactured in accordance with FCC, NEC, UL, and USDL requirements and orders applicable to Federal, State, and local requirements including, but not limited to, statutes, rules, regulations, orders, or ordinances, or otherwise imposed by law. Requirements that are not specified in this document, contractual technical requirements, or other applicable documents, shall meet the manufacturer's requirements consistent with industry standards.

5.03 The open circuit tip-to-ring dc voltage that collocated CLEC equipment applies to BA VF cabling shall be less than 80 Vdc.

5.04 Collocated CLEC equipment shall not deliver more than 2.5 watts of power to any load via BA VF cable.

5.05 Collocated CLEC equipment shall not deliver more than 150 mA of loop current to any load via BA VF cable.

5.06 The noise limits for unbundled digital loops require collocated CLEC equipment to have a longitudinal balance of >60 dB.

5.07 The loss and noise limits for unbundled 2WDI loops require collocated CLEC equipment to have a nominal impedance of 135 ohms.

5.08 The maximum power level of any transmitted signal on an unbundled 2WDI loop shall not exceed the PSD mask in Figure 2-2 and the specifications in ANSI T1.601-1992 [1].

5.09 The maximum power level of any transmitted signal on an unbundled 4WD1.5 loop shall not exceed the specifications in ANSI T1.403-1993 [3].

5.10 The maximum power level of any transmitted signal on an unbundled 2WDH or 4WDH loop shall not exceed the PSD mask in Figure 2-7 and the specifications in T1 Technical Report No. 28 [5].

5.11 The maximum power level of any transmitted upstream signal on an unbundled 2WDA-R or 2WDA-C loop shall not exceed the applicable upstream PSD mask in Figure 2-9 or Figure 2-10. The maximum power level of any transmitted downstream signal on an unbundled 2WDA-R or 2WDA-C loop shall not exceed the applicable downstream PSD mask in Figure 2-11 or Figure 2-12.

5.12 The maximum power level of any transmitted signal on an unbundled 4WDS3 loop shall not exceed the specifications in ANSI T1.404-1994 [10].

5.13 Unbundled loops may be exposed to electrical surges from lightning and commercial power system disturbances. Despite protective devices on the CODF, some of these disturbances are likely to reach CLEC equipment. CLEC equipment shall be designed to withstand certain surges without being damaged, and shall fail in a safe manner under infrequent high stress.

5.14 The prevalent voltage-limiting device available for CO use is the 3-mil carbon block. This device has an upper 3σ limiting voltage of 1000 volts peak under surge conditions and 600 volts rms (800 peak) at 60 Hz.

CLEC equipment connected to digital unbundled loop services with loops protected by carbon blocks may be subjected to voltages up to these levels. Unexposed COs may not have primary protection, and CLEC equipment not co-ordinating with carbon blocks may need protection in these locations.

5.15 If the subscriber loop facility is exposed to commercial ac power, the CO protector may also include 350 mA heat coils for limiting the current that is permitted to flow to CO equipment. In addition, a protective fuse cable located outside the CO incorporating 24 or 26 AWG conductors to coordinate with the protector, serves to limit current to safe levels in the event of prolonged operation of the protector during power fault conditions.

B. CLEC Equipment CO Cabling Requirements

5.16 The CO cabling used to terminate CLEC equipment on the CODF shall use twisted-pair conductors.

5.17 The type, gauge, and length of the CLEC CODF cabling shall be specified based on this specification and CLEC equipment requirements. If the specifications in this document differ from the CLEC equipment manufacturers specifications, then the more stringent of the two shall be used.

5.18 The direct-current resistance of the CO cabling between the CLEC equipment and the CODF shall meet the CO cabling requirements in the Bellcore FR-TSY-000064 [18] (i.e., 23 ohms or less). This is equivalent to 275 feet or less of 26 gauge cable, 440 feet or less of 24 gauge cable, and 700 feet or less of 22 gauge cable.

5.19 All CO cabling between CLEC equipment and the CODF shall be connected as specified by the BA CO Engineer.

5.20 The 1kHz loss of the CO cabling between the CLEC equipment and the CODF, when measured between 900 ohm impedances, shall be less than .15 dB.

5.21 The C-message noise measured on the CO cabling between the CLEC equipment and the CODF shall be 20 dBrnC or less.

C. CLEC DSX-1 Cabling Requirements

5.22 CLEC DSX-1 cabling and build-out in each direction of transmission shall be the equivalent of 655 feet of 22 gauge ABAM cable.

D. CLEC DSX-3 Cabling Requirements

5.23 CLEC DSX-3 cabling and build-out in each direction of transmission shall be the equivalent of 450 feet of 75-ohm coaxial cable.

6. References

A. Definitions

Asymmetrical Digital Subscriber Line (ADSL)
A transmission system that is capable of transmitting digital signals at different upstream and downstream rates on the same loop as POTS. Standard ADSL systems use the Discrete Multitone (DMT) line code.

B Channel
The B channel is a 64 kilobit per second channel used for information transfer between users.

Bit
An abbreviation for binary digit; one of the members of a set of two in the binary numeration system, e.g., either or the digits 0 or 1. Also, a unit of information; one bit of information is sufficient to specify one of two equal and likely possibilities, usually meaning *yes* or *no*.

Bridged tap
Any branch section of a cable pair, or any extension of a cable pair beyond the point where it is used, in which no direct current flows when customer equipment is connected and used.

Carrierless AM/PM (CAP)
An ADSL line code technique that maps serial bits into phase and quadrature symbols and uses a filter to provide passband spectral shaping.

Carrier Serving Area (CSA) Design
Loop distribution design guidelines developed for metallic extensions from Digital Loop Carrier Remote Terminals to customer premises. Maximum CSA cable length plus total bridged tap is ≤12 kft.

Central Office (CO)
A telephone company building which houses equipment and facilities used to provide switched access services.

Central Office Distributing Frame (CODF)
Framework located in a CO that holds wire cross-connects which are used to interconnect cable terminations for EU customer loops, switching system ports, and inter-office facilities.

Certified Local Exchange Carrier (CLEC)
An organization that has been certified in a state to provide local exchange telecommunications services to the public.

Channel
An electrical, or photonic communications path between two or more points of transmission.

C-Message Noise
The frequency-weighted, short-term average noise within an idle channel. The frequency weighting, called C-message, is used to account for the variations in 500-type telephone set transducer efficiency and EU annoyance to tones as a function of frequency.

dBm
A unit for expression of power level in decibels relative to one milliwatt.

dBrn
A unit used to express noise power in decibels relative to one picowatt (-90 dBm).

dBm0
A unit used to express power level in decibels relative to one milliwatt referred to, or measured at, a zero transmission level point (0TLP). A unit used to express noise power in decibels relative to one picowatt measured with C-message weighting.

dBrnC0

Noise power in dBrnC referred to, or measured at, a zero transmission level point (0TLP).

D Channel
The D Channel is a 16 kilobit per second packet-switched channel that carries signaling and control for the B channels and also supports customer packet data traffic at speeds up to 9.6 kilobits per second.

Decibel (dB)
The logarithmic unit of signal power ratio most commonly used in telephony. It is used to express the relationship between two signal powers, usually between two acoustic, electric, or optical signals; it is equal to ten times the common logarithm of the ratio of the two signal powers.

Digital Signal Level One (DS1)
A digital signal transmitted at the nominal rate of 1.544 Mbit/s.

Digital Signal Level Three (DS3)
A digital signal transmitted at the nominal rate of 44.736 Mbit/s.

Discrete Multitone (DMT)
An ADSL line code that is a version of multi-carrier modulation that allows allocation of physical payload data bits and perhaps transmitter power among many subchannels depending on the loss and interference encountered.

Drop wire
The last portion of many subscriber loops that connects the distribution cable to the customer premises. The most common aerial drop wire (F-type) has parallel 18 ½ gauge steel conductors that are not twisted. Drop wires are usually less than 700 feet and less than 25 ohms.

Digital Signal Cross-Connect Level One (DSX-1)
A mechanical DS1 cross-connect frame where +/- 3 volt bipolar AMI signals are interconnected.

Facilities
Any cable, poles, conduit, microwave, or carrier equipment, central office distributing frames, central office switching equipment, computers (both hardware and software), business machines, etc., utilized to provide the services offered by a telephone company.

Foreign Voltage
Foreign voltage is any extraneous voltage that appears on the loop. Two examples of foreign voltage are an ac voltage induced onto the loop from an adjacent parallel commercial power facility or a dc voltage conducted through wet cable. Foreign voltage must be measured with a high impedance voltmeter or erroneous readings may result.

High-Bit-Rate Digital Subscriber Line (HDSL)
An echo-canceller-with-hybrid system that provides full duplex transmission over a single metallic twisted-pair at a line rate up to 784 kbps using the 2B1Q line code.

Insulation Resistance
The resistance between the tip and ring conductors of an insulated metallic pair or the resistance between each conductor and ground. Also known as leakage or leakage resistance.

Integrated Services Digital Network (ISDN)
ISDN describes the end-to-end digital telecommunications network architecture which provides for the simultaneous access, transmission , and switching of voice, data, and image services. These functions are provided via channelized transport facilities over a limited number of standard user-network interfaces.

Loop

A transmission channel between a EU customer location and a BA CO that is used as a transmission channel for telephone company services.

Plain Ordinary Telephone Service (POTS)
The basic single line switched access service offered by local exchange carriers to residential and business customers. POTS uses loop-start signaling.

Power Influence (PI)
The power of a longitudinal signal induced in a metallic loop by an electromagnetic field emanating from a conductor or conductors of a power system. PI is also called longitudinal noise or noise-to-ground.

Rate Demarcation Point (RDP)
The point at which BA network access recurring charges and responsibility stop and beyond which customer responsibility begins. The RDP is the point of demarcation and/or interconnection between a BA subscriber loop facility and EU premises cabling or terminal equipment. BA facilities at, or constituting, the rate demarcation point shall consist of wire or a connector conforming to Subpart F of Part 68 of FCC rules.

Revised Resistance Design (RRD)
Loop design guidelines used after 1986. RRD design criteria allows up to 1300 ohms of non-loaded cable. Non-loaded cable is further limited in length to 18 kft. The total length of all bridged tap should not exceed 6 kft. The total length of all non-loaded cable plus the length of all bridged tap should not exceed 18 kft. Loaded bridged tap is not permitted.

Secondary Channel
A capability that offers the customer a companion digital transmission channel independent of the Primary Channel at a lower bit rate than the Primary Channel.

Synchronous Transmission
Transmission that has three levels of synchronization: bit, character, and message. Bit synchronization refers to the need for the transmitter and receiver to operate at the same rate. Other levels of synchronization refer to the need for the transmitter and receiver to achieve proper phase alignment, so that the beginning and end of a character, message, time slot, or frame can be readily, identified for information retrieval.

Transmission Enhancement Equipment
In general, any equipment that improves the characteristics of a transmitted signal. In this document, transmission enhancement equipment is any equipment that regenerates a digital signal.

Unbundled Loop
A transmission channel between a EU customer location and a LEC CO that is not a part of, or connected to, other LEC services.

Unbundled 2WDA-C Loop
An unbundled 2-wire loop that meets selected Revised Resistance Design criteria (i.e., non-loaded, length $\leq$ 12 kft, etc.) and is suitable for the transport of POTS signals and ADSL signals at different downstream and upstream rates. The actual data rate on a particular unbundled 2WDA-C loop depends upon the performance of the CLEC and EU-provided modems with the electrical characteristics (length, bridged tap, noise, etc.) associated with the loop.

Unbundled 2WDA-R Loop
An unbundled 2-wire loop that meets selected Revised Resistance Design criteria (i.e., non-loaded, length $\leq$ 18 kft, etc.) and is suitable for the transport of POTS signals and ADSL signals at different downstream and upstream rates. The actual data rate on a particular unbundled 2WDA-R loop depends upon the performance of the CLEC and EU-provided modems with the electrical characteristics (length, bridged tap, noise, etc.) associated with the loop.

Unbundled 2-Wire Digital ADSL-Qualified (2WDA) Loop

An unbundled loop that provides an effective 2-wire channel that may be suitable for the transport of POTS and ADSL signals between the Bell Atlantic central office distributing frame termination of collocated equipment belonging to a CLEC and the rate demarcation point at a customer location. Two types of unbundled 2-wire ADSL-qualified loops are offered: the unbundled 2WDA-R loop and the unbundled 2WDA-C loop.

Unbundled 2-Wire Digital ISDN-Qualified (2WDI) Loop
An unbundled loop that provides an ISDN basic rate channel between the Bell Atlantic central office distributing frame termination of collocated equipment belonging to a CLEC and the rate demarcation point at a customer location. The channel is suitable for the transport of 160 kbps digital signals in both directions simultaneously using the 2B1Q line code described in ANSI T1.601-1992 [1].

Unbundled 2-Wire or 4-Wire Digital HDSL-Qualified (2WDH or 4WDH) Loops
An unbundled loop that provides either a 2-wire or 4-wire channel that may be suitable for the transport of High-Bit-Rate Digital Subscriber Line signals between the Bell Atlantic central office distributing frame termination of collocated equipment belonging to a CLEC and the network interface device at a customer location. Two types of unbundled HDSL-Qualified loops are offered: 2WDH or 4WDH. An unbundled 2WDH loop provides the CLEC with a channel that may be suitable for the transport of 784 kbps digital signals simultaneously in both directions. An unbundled 4WDH loop provides the CLEC with a channel that may be suitable for the transport of 1.568 Mbps digital signals simultaneously in both directions. Unbundled 2WDH and 4WDH loops are intended for the transport of 2B1Q signals as described in Committee T1 Technical Report No. 28 [5].

Unbundled 4-Wire Digital DS1 (4WD1.5) Loop
An unbundled loop that provides a 4-wire channel that is suitable for the transport of 1.544 Mbps (DS1) digital signals in both directions simultaneously between the Bell Atlantic central office DSX-1 termination of collocated equipment belonging to an CLEC and the network interface device at a customer location. The unbundled 4WD1.5 loop may be provided using a variety of loop transmission technologies.

Unbundled 4-Wire Digital DS3 (4WDS3) Loop
An unbundled loop that provides a 4-wire channel that is suitable for the transport of 44.736 Mbps (DS3) digital signals in both directions simultaneously between the Bell Atlantic central office DSX-3 termination of collocated equipment belonging to an CLEC and the network interface device at a customer location. The unbundled 4WDS3 loop may be provided using a variety of loop transmission technologies.

Voicegrade (VG)
A term used to describe a channel, circuit, facility, or service that is suitable for the transmission of speech, digital or analog data, or facsimile, generally with a frequency range of about 300 to 3000 Hz.

B. Acronyms

ADSL	Asymmetrical Digital Subscriber Line
AL	Acceptance Limit
AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
BA	Bell Atlantic
BER	Bit Error Ratio
BRITE	Basic Rate ISDN Terminal Equipment
B8ZS	Bit Eight Zero Suppression
CPE	Customer Premises Equipment
CAP	Carrierless AM/PM
CO	Central Office
CODF	Central Office Distributing Frame
COT	Central Office Terminal
CSA	Carrier Serving Area
DLC	Digital Loop Carrier
DMT	Discrete Multi-Tone
DSX-1	Digital Signal Cross-Connect Level One
DS0	Digital Signal Level Zero
DS1	Digital Signal Level One
DVM	Data-Voice Multiplexer
EFS	Error-Free Seconds
ESF	Extended Superframe Format
EU	End-User
HDSL	High-Bit-Rate Digital Subscriber Line
IAL	Immediate Action Limit
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LT	Line Terminating
NC	Network Channel
NCI	Network Channel Interface
NID	Network Interface Device
NT	Network Terminating
CLEC	Other Telephone Company
PI	Power Influence
POT	Point of Termination
POTS	Plain Ordinary Telephone Service
RDP	Rate Demarcation Point
RRD	Revised Resistance Design
RT	Remote Terminal
SES	Severely Errored Second
SF	Superframe Format
USOC	Universal Service Order Code
VF	Voice Frequency
VG	Voicegrade
2B1Q	Two-Bit One-Quaternary
2WDA-R	ADSL Unbundled Loop Service - Revised Resistance Design - 18 kft max.
2WDA-C	ADSL Unbundled Loop Service - Revised Resistance Design - 12 kft max.
2WDH	Unbundled 2-Wire Digital HDSL-Qualified Loop
2WDI	Unbundled 2-Wire Digital ISDN-Qualified Loop
4WDH	Unbundled 4-Wire Digital HDSL-Qualified Loop
4WD1.5	Unbundled 4-Wire Digital DS1 Loop

7. Bibliography

1- ANSI T1.601-1992, American National Standard for Telecommunications - *ISDN - Basic Access Interface for Use on Metallic Loops for Application at the Network Side of NT, Layer 1 Specification.*[2]

2- Code of Federal Regulations, Title 47, FCC Rules and Regulations, Part 68, *Connection of terminal equipment to the telephone network.* Washington, DC: Federal Communications Commission. [3]

3- ANSI T1.403-1995, American National Standard for Telecommunications - *Network-to-Customer Installation - DS1 Metallic Interface.*[2]

4- ANSI T1.102-1993, American National Standard for Telecommunications - *Digital Hierarchy - Electrical Interfaces.*[2]

5- Committee T1 - Telecommunications Report No. 28, *A Technical Report on High-Bit-Rate Digital Subscriber Lines (HDSL)*, 1992.

6- Generic Requirements GR-1089-CORE, *Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment*, Issue 1 Bellcore, December 1994.[4]

7- ANSI T1.413-1998, American National Standard for Telecommunications - *Network and Customer Installation Interfaces - Asymmetric Digital Subscriber Line (ADSL) Metallic Interface.*[2]

8- T1E1/97-104R2, Draft Proposed American National Standard for Telecommunications - *Rate-Adaptive Digital Subscriber Lines.*

9- ANSI T1.401-1993, American National Standard for Telecommunications - *Interface Between Carriers and Customer Installations - Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signaling.*[2]

10- ANSI T1.404-1994, American National Standard for Telecommunications - *Network-to-Customer Installation - DS3 Metallic Interface Specification.*[2]

11- Special Report SR-2275, Issue 3, *Bellcore Notes on the Networks*; Bellcore; December 1997.[4]

12- ANSI/IEEE 743-1995, *Standard Methods and Equipment for Measuring the Transmission Characteristics of Analog Voice Frequency Circuits.*[2]

13- Special Report SR-STS-000307, *NC/NCI Code Dictionary,* Issue 8, Bellcore, April 1997.[4]

14- Special Report SR-STS-000323, *NC/NCI Compatibility Guide,* Issue 4, Bellcore, May 1994.[4]

15- Bell Atlantic Network Services Reference Manual Series 72710 & NS6050.

16- ANSI T1.107-1995, American National Standard for Telecommunications - *Digital Hierarchy - Formats Specifications.*[2]

17- Generic Requirements GR-63-CORE, *Network Equipment-Building System (NEBS) Requirements: Physical Protection,* Issue 1, Bellcore, December 1995.[4]

18- Technical Reference FR-NWT-000064, *LATA Switching Systems Generic Requirements* (LSSGR), Bellcore, 1994.[4]

NOTE: These documents are subject to change. References reflect the most current information available at the time of printing. Readers are advised to check the status and availability of all documents.

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[2] To obtain ANSI documents, contact American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

[3] Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

[4] To obtain Bellcore documents, contact Bellcore Customer Service, 8 Corporate Place - PYA 3A-184, Piscataway, NJ 08854-4156. In the US and Canada, call 1-800-521-CORE. All others call 908-699-5800.

Exhibit D

available statewide.) CLECs can determine loop qualification through either the loop qualification database or the manual qualification process.

103. BA-NY will not restrict the CLEC's ability to implement its desired xDSL service as long as the implemented technologies are consistent with the recent FCC Order and have been demonstrated to work and do not cause interference in the network.

104. For those loops that are not initially suited for xDSL because they require some form of conditioning (*e.g.*, the removal of a load coil), BA-NY has developed a digital designed loop offering. Digital designed loops will satisfy the need for premium loops over 18,000 feet that can be used for the provision of ISDN or compatible IDSL. In addition, digital designed loops will provide CLECs the ability to obtain copper UNE loops with optional conditioning, including the removal of excessive bridge taps, the removal of load coils and, in the case of premium loops, the addition of electronics. Furthermore, BA-NY will swap facilities in order to provision a copper loop.

105. As a result, CLECs can avail themselves of 2-wire UNE loops with over 18,000 feet of copper and BA-NY will remove the load coils and bridge taps. This offering will also facilitate the CLECs receiving copper loops. CLECs will be able to obtain loops less than 18,000 feet in length with no bridge tap as an option and for an additional charge.

106. For ISDN service beyond 18,000 feet, the digital design offering will provide a 2-wire copper premium UNE loop with BA-NY electronics 2B1Q signaling.

xDSL National Standards and Spectrum Management

107. ACI contends that BA-NY unilaterally intends to impose unnecessary technical requirements on competitors' provision of xDSL services. (ACI ¶ 8.) ACI's concerns are unfounded. Bell Atlantic recognized the need to develop a process that would allow it to manage

the co-existence of multiple carrier services in the same cable, as well as establish procedures for the introduction of new services. In the absence of an existing standard, Bell Atlantic developed a Technical Reference (TR-72675) that is available to CLECs on the Bell Atlantic corporate website. This document does not restrict or limit CLEC services, but rather lends some assurance that services can co-exist and be added to the network without interference between other services sharing these cables.

108. The Spectrum Management Guidelines referenced in the Joint Supplemental Affidavit identify the procedures that should be used by all carriers to minimize the potential for services and technologies to receive interference from, or generate interference to, other services and technologies that share the same cable. In addition, the Bell Atlantic Technical Reference is largely based on approved ANSI standards and generally accepted outside plant engineering practices.

109. The FCC has recognized the need for industry guidelines in the area of spectrum management and supports the development of such standards through the T1E1 Standards forum. In fact, the letter from the FCC to ANSI/T1/T1E1 in March 1999 requested that the ANSI/T1 standard be available *by year-end 1999* and stated "[t]hese requirements are urgently needed in order to expedite the deployment of advanced service as outlined in the Telecommunications Act of 1996." This effort, however, is a relatively recent development.

110. BA-NY's Spectrum Management Guidelines are based on existing industry standards and utilize the same Power Spectral Density ("PSD") masks as Mr. Geis references in his affidavit. (ACI-Geis ¶¶ 72-73.) These guidelines were intended to address an interim void of industry standards in the area of spectrum management. BA-NY fully supports the development

of industry standards for spectrum management in the T1E1.4 committee and has offered numerous contributions during 1999 in support of this work.

111. ACI also erroneously dismisses the need for ongoing spectrum management and the potential for interference or harm to the network from future technologies. (ACI-Geis ¶¶ 77-79.) ACI falsely assumes that the mere existence of a PSD mask for a DSL technology assures that interference with existing services will not occur. In addition, ACI wrongly identifies AMI T1 as the only potential "interferor" with DSL technology. The rapidly developing DSL market will continue to challenge the industry with new implementations of equipment operating at various rates, protocols and loop lengths. For example, recent contributions to the T1E1.4 spectrum management group have shown that SDSL systems operating at rates at and above 1168 kbps, as well as overlapping ADSL systems are known to interfere with Discrete Multitone ADSL. Contrary to the position that ACI has put forward, spectrum management presents a technological challenge that must be met on an ongoing basis as DSL technology and services develop. BA-NY has taken the first important steps in meeting that challenge.

Loop Qualification Information

112. ACI and Covad raise concerns over BA-NY's description of the loop qualification information description in its Joint Supplemental Affidavit. These concerns are misleading and unfounded. The data available to CLECs in BA-NY's loop qualification database includes loop length information for loops up to 18,000 feet even though loop length information over 12,000 feet is not used for BA-NY's commercial ADSL retail offering.

113. Additional information that is not included in the database can be obtained through a manual process or a conditioning process. Contrary to the assertions of both ACI and Covad, loop makeup information is not available for all loops via electronic systems and BA-NY

* * * **REDACTED VERSION** * * *

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Petition of New York Telephone Company for Approval of its Statement of Generally Available Terms and Conditions Pursuant to Section 252 of the Telecommunications Act of 1996; and Draft Filing of Petition for InterLATA Entry Pursuant to Section 271 of the Telecommunications Act of 1996 to Provide In-Region, InterLATA Services in the State of New York	:	Case 97-C-0271

JOINT SUPPLEMENTAL REPLY AFFIDAVIT OF DONALD E. ALBERT, JULIE A. CANNY, GEORGE S. DOWELL, KAREN MAGUIRE AND PATRICK J. STEVENS ON BEHALF OF BELL ATLANTIC - NEW YORK

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